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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,058	10/26/2001	Alexander I. Krymski	08305-087002	9431

7590

05/28/2003

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EXAMINER

LUU, THANH X

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 05/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,058

Applicant(s)

KRYMSKI ET AL.

Examiner

Thanh X Luu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, an embodiment in which a PMOS frame shutter in a N-well and wherein the circuits comprise NMOS transistors of claim 10 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 5 and 16 are objected to because of the following informalities:

In claims 5 and 16, "the quantum efficiency" lacks proper antecedent basis.

In claims 11 and 18, "the fill factor" lacks proper antecedent basis.

In claims 12 and 19, "the pixel pitch" lacks proper antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification fails to describe of an embodiment in which the frame shutter is PMOS and the sample and hold and reset circuits are NMOS transistors.

6. Claims 11 and 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is unclear how a PMOS shutter in a N-well increases the fill factor and reduces the pixel pitch. As described in the specification (page 5, middle of the page), only the P-well increases fill factor and reduces the pixel pitch.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

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applicant regards as the invention.

Regarding claims 18 and 19, "the PMOS frame shutter" lacks proper antecedent basis. Further, it is unclear how a PMOS frame shutter increases a fill factor and reduces a pixel pitch.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Gowda et al. (U.S. Patent 5,898,168).

Regarding claims 1, 5 and 6, Gowda et al. disclose (see Figure 15) an active pixel sensor, comprising: a photoreceptor (26), wherein the photoreceptor comprises a pinned photodiode (see column 11, line 15); a frame shutter (230, 22, 92, 21, 23); and an active pixel readout (31). The pinned photodiode inherently increases a quantum efficiency and reduces dark current as such characteristic of pinned photodiodes.

11. Claims 7-9, 11 and 12, as understood, are rejected under 35 U.S.C. 102(a) as being anticipated by Applicant's admitted prior art (Figure 2), hereinafter, AAPA.

Regarding claims 7-9, 11 and 12, AAPA discloses (see Figure 2) an active pixel sensor, comprising: a photoreceptor (205); a frame shutter (207), wherein the frame shutter is a PMOS frame shutter in a N-well; and an active pixel readout (230). AAPA

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further discloses the photoreceptor comprises a photogate and the frame shutter includes sample and hold and reset circuits. The PMOS frame shutter inherently increases a fill factor and reduces a pixel pitch since the structure of the sensor is the same as the claimed structure.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 2-4, 7-9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gowda et al. in view of Liu et al. (U.S. Patent 6,300,632).

Regarding claims 2-4, 7-9, 11 and 12, Gowda et al. disclose the claimed invention as set forth above. Gowda et al. also disclose (see Figure 15) the frame shutter includes sample and hold and reset circuits. Gowda et al. do not specifically disclose the frame shutter is a PMOS frame shutter in an N-well or the circuits comprise PMOS transistors. Liu et al. teach (see Figure 7) an active pixel sensor with PMOS circuitry in an N-well. Liu et al. further recognize (see abstract) that such a configuration allows for the PMOS circuitry to be more resilient to temperature changes. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide PMOS frame shutter in an N-well or circuits comprising PMOS transistors in the apparatus of Gowda et al. in view of Liu et al. to provide better maintain a constant sensor temperature and improve detection. A fill factor is increased

and a pixel pitch is decreased as the apparatus of Gowda et al. in view of Liu et al. have the same structure as the claimed invention.

14. Claims 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gowda et al. in view of Kalnitsky et al. (U.S. Patent 6,380,571).

Regarding claims 13-19, Gowda et al. disclose (see Figure 15) an active pixel sensor, comprising: a photoreceptor (26), wherein the photoreceptor comprises a pinned photodiode (see column 11, line 15); a frame shutter (230, 22, 92, 21, 23); and an active pixel readout (31). The frame shutter includes sample and hold and reset circuits, wherein the circuits comprise NMOS transistors. The pinned photodiode inherently increases a quantum efficiency and reduces dark current as such characteristic of pinned photodiodes. Gowda et al. further disclose (see Figure 15) NMOS transistors. Gowda et al. do not specifically disclose the frame shutter comprises an NMOS frame shutter in a P-well. Kalnitsky et al. teach (see Figure 2) active pixel sensors with NMOS transistors in a P-well. Thus, Kalnitsky et al. recognize that NMOS circuitry in a P-well is typical. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an NMOS frame shutter in a P-well in the apparatus of Gowda et al. in view of Kalnitsky et al. to further isolate the NMOS circuitry and improve sensitivity. The P-well inherently increases a fill factor and reduces the pixel pitch since such properties are characteristic of P-well sensors.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of AAPA or Gowda et al. in view of Liu et al.

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Regarding claim 10, AAPA or Gowda et al. in view of Liu et al. disclose the claimed invention as set forth above. AAPA, Gowda et al. and Liu et al. do not specifically disclose the sample and hold and reset circuits comprise NMOS transistors. However, it is notoriously well known in the art that PMOS and NMOS transistors are interchangeable. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide NMOS transistors in the apparatus of AAPA or Gowda et al. in view of Liu et al. as desired to match the transistors in other parts of the sensor.

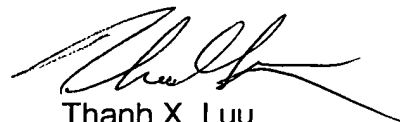
Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is (703) 305-0539. The examiner can normally be reached on Monday-Friday from 6:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta, can be reached on (703) 308-4852. The fax phone number for the organization where the application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

txl
May 22, 2003


Thanh X. Luu
Patent Examiner